Date: Thu, 3 Mar 94 04:30:25 PST
From: Ham-Ant Mailing List and Newsgroup <ham-ant@ucsd.edu>
Errors-To: Ham-Ant-Errors@UCSD.Edu
Reply-To: Ham-Ant@UCSD.Edu
Precedence: Bulk
Subject: Ham-Ant Digest V94 #53
To: Ham-Ant

Ham-Ant Digest   Thu, 3 Mar 94   Volume 94 : Issue   53

Today's Topics:

Send Replies or notes for publication to: <Ham-Ant@UCSD.Edu>
Send subscription requests to: <Ham-Ant-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Ant Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-ant".

Date: Tue, 1 Mar 1994 16:37:33 GMT
From: ihnp4.ucsd.edu!swrinde!gatech!howland.reston.ans.net!news.ans.net!
malgudi.oar.net!utnetw.utoledo.edu!uoft02.utoledo.edu!cscon0151@network.ucsd.edu
Subject: 2m Groundplane Antenna Question
To: ham-ant@ucsd.edu

ebs@csparc046.cirrus.com (eric smith) writes:

> Here is some background info. I built a 2m groundplane antenna similar to
> those described in the ARRL Antenna Handbook. I used #6 solid copper wire
> for the monopole and the radial elements. I inserted the monopole element
> directly into a S0239 connector. I hammered the ends of the radials flat,
> bent them down at a 45 deg angle, drilled holes in them, screwed them in
> place and soldered them.   I mounted the antenna on a pvc mast that kept
> the radials about 4 1/2 ft off of the ground. I started out with each element
> 24" long.

4 1/2 ft off the ground.... I remember reading about a principle of improving ground plane antenna abilities, I believe it was important to keep the antenna at a height above the ground that was 1/2, 1/4, etc. wave. Could anyone quickly explain that rule?

I think I might get an antenna theory book soon, antennae design fascinates me!

73s

Brad Steinman, N8ZRP
The University of Toledo
Internet: cscon0151@uoft02.utoledo.edu (131.183.1.4)
          stu0105@uoft01.utoledo.edu   (131.183.1.2)
Packet : N8ZRP@w2xo.#swpa.pa.usa.noam (Amateur Radio Packet Network)
* Member of the All-Ohio Scanner Club (OH-48-1859) * yah...

Date: Tue, 1 Mar 1994 21:26:38 CST
From: ihnp4.ucsd.edu!swrinde!gatech!howland.reston.ans.net!vixen.cso.uiuc.edu!news.eecs.uic.edu!uicvm.uic.edu!u29255@network.ucsd.edu
Subject: Can I supplement antenna on a pager?
To: ham-ant@ucsd.edu

My good friend, N9SCU, (who does not yet have internet access) asked me if I could help him.
He says that in his new desk at work, his pager does not receive; he has to put it in someone else's desk and check it every so often.
What kind of antenna, maybe a nice little wire (what length) could be led to the pager, and then the signal "induced" (how?) by a coil (diameter? turns?) to get the signal into the pager.
Or, maybe you know how to crack open a Motorola digital number-only pager to get at the antenna terminal & ground to maybe hard-wire an external antenna (what kind/size/length?).
As you can see, I have a lot of questions, but your comments are welcome on any of them. Thanks in advance!   73 8)   AA9IF

Date: Tue, 1 Mar 1994 17:07:19 GMT
From: ihnp4.ucsd.edu!swrinde!cs.utexas.edu!howland.reston.ans.net!gatech!paladin.american.edu!constellation!osuunx.ucc.okstate.edu!olesun!gcouger@network.ucsd.edu
Subject: ELNEC USERS??
To: ham-ant@ucsd.edu

Gordon AB5DG

Date: 2 Mar 94 15:48:21 GMT
From: news-mail-gateway@ucsd.edu
Subject: Ham-Ant Digest V94 #52
To: ham-ant@ucsd.edu

Bob, KD1GG writes:

>I have a 50' tower that I would like to use somehow
>to help construct an inverted L for 160. Is an
>inverted L with a 50' height and a flat top section
>of about 100' usable on 160? Anyone know where to
>find some design guide, like radial placement etc..

I'll tell you of my experience with a similar configuration.
I use a 48' tower w/15' of mast above it that hold 2 monobanders
for 20M & 15M. At the 48' point I attached a coax feedline with the
braid going to the tower & a horizontal (sometimes sloping) wire
about 112' long connected to the center conductor. This antenna
works amazingly well - I've worked over 105 countries with it.
Its not a resonant antenna, so I use a homebrew tuner to bring the
SWR down to a managable level. The antenna is fed with RG-11 (75 ohm)
coax.

Having modelled it on ELNEC has shown that it is (almost)
unidirectional with a good low angle. Main lobe is at 35 degrees, but
the lower -3dB point (in the vertical plane) is at 9 degrees.
It has plenty of horizontal component to allow working locals and
the vertical component (the tower's contribution) is substantial enough
to have allowed me to work 3Y0PI on 160 SSB.

I attached 2 radials 140' long to the base of the tower and connected these
to my swimming pool. I don't think this is efficient from a ground resistance
point of view, but it sure was easy to do. If you place more radials at the
base of the tower the low angle performamce should improve considerably.
My models have shown that 120, 140' radials bring the main lobe down to
24 degrees.

I hope that gives you enough encouragement to try something similar
at your location. Good luck & enjoy top band.   73 de Walt - K2WK

Date: Wed, 2 Mar 1994 10:05:47 GMT
From: ihnp4.ucsd.edu!library.ucla.edu!europa.eng.gtefsd.com!
howland.reston.ans.net!gatech!wa4mei.ping.com!ke4zv!gary@network.ucsd.edu
Subject: mechanical analogue of radiation resistance?

To: ham-ant@ucsd.edu

In article <CLyB6n.CLz@srgenprp.sr.hp.com> alanb@sr.hp.com (Alan Bloom) writes:
>Alan M. Horowitz (horowitz@nosc.mil) wrote:
>: Mostly, we can find mechanical analogues to electrical phenomena.
>: What is the mechanical analogue of radiation resistance?
>
>In an automobile, horsepower is like the transmitted power into an
>antenna.
>
>The rolling resistance and wind resistance (i.e. power required to
>make the car go) are like the radiation resistance of an antenna.

I don't think that's a very good analogy. If we decrease rolling
and wind resistance, our car can go faster. If we decrease radiation
resistance, I don't think our signal goes further. :-)

Radiation resistance is a "fictitious" resistance in the same sense
as centrifugal force is a "fictitious" force, or as a load line is
the output "resistance" of an amplifier. It's just a mathematical
intermediary for purposes of calculation.

Think of an antenna as an automotive transmission. It's job is to
match the motor torque to the load torque requirement. An antenna's
purpose is to act as a coupling between the feed point impedance and
the impedance of free space. Antenna resistance can be thought of as
an intermediate planetary gear in the transmission. If it's grossly
too big or too small, the efficiency of the unit will suffer. In the
same way, if the radiation resistance of an antenna is too big or too
small, the efficiency of the antenna suffers in coupling feedline RF
to free space.

Too big and too small are, of course, relative terms, which is why
different intermediate gear sizes can be to some extent compensated
by using different input or output gear sizes, or in the case of
antennas, different matching networks. But when values for either
get too extreme, efficiency suffers.

Gary
--

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Lawrenceville, GA 30244 | |

Date: Tue, 1 Mar 1994 16:57:34 GMT

From: ihnp4.ucsd.edu!swrinde!gatech!darwin.sura.net!gatekeeper.es.dupont.com!
esds01.es.dupont.com!MEHDIZM%esvx19.es.dupont.com@network.ucsd.edu
Subject: MFJ SWR Analyzers
To: ham-ant@ucsd.edu

In article <henrysCLzps3.4Ez@netcom.com>, henrys@netcom.com (Henry B. Smith)
writes:
>Is anybody familiar with either the MFJ-249 or MFJ-259 SWR analyzers?
>Can the MFJ-259 really measure feed-point resistance when it is
>inserted at the equipment end of the coax?
>
>A general question: Can you dependably determine the resonance of an
>antenna by looking for the lowest SWR?
>
1- Strictly speaking, no. SWR is a quantity which some of the vector
nature of impedances is lost in it. Resistance is only the real part
of an impedance. Reflection coeficient (Greek row) is the ratio of
complex impedance of the load to the characteristic impedance of the
line. Then SWR is (1+Abs(Row))/(1-Abs(Row)), where Abs(Row) means the
absolute value of Row. This is where the pure resistance information
gets dropped. Therefore SWR only a measure of how much power goes in,
and how much is reflected. In order to arrive at resistance, you need
some phase information.

2- Yes, the lowest SWR an exact indicative of resonance of an antenna,
as it is connected to the line. However, if the coupling of the antenna
to the line changes, there is a small shift in the resonance.

Date: Tue, 1 Mar 1994 16:23:50 GMT
From: ihnp4.ucsd.edu!swrinde!gatech!wa4mei.ping.com!ke4zv!gary@network.ucsd.edu
Subject: MFJ SWR Analyzers
To: ham-ant@ucsd.edu

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>inserted at the equipment end of the coax?
>
>A general question: Can you dependably determine the resonance of an
>antenna by looking for the lowest SWR?

No. This only works if the antenna feed point impedance approaches
the characteristic impedance of the coax most closely at resonance.
That's roughly true for dipoles, but not for some other types of
antennas. For example, a 1/4-wave monopole has a feed point impedance

at resonance of about 36 ohms. At either side of resonance, the
impedance (complex) increases. So there are two points where the
impedance will be closer to 50 ohms than the resonant point. So
if you see 1:1 SWR on your 1/4-wave monopole, there's something
wrong. (In fact as a general rule of thumb, if you have a SWR of
1:1 on any simple antenna which has no special matching network
at it's feed point, there's something wrong.)

Gary
--

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Lawrenceville, GA 30244 | |

Date: 1 Mar 1994 21:23:39 GMT
From: ihnp4.ucsd.edu!swrinde!elroy.jpl.nasa.gov!ncar!elmore@network.ucsd.edu
Subject: MFJ SWR Analyzers
To: ham-ant@ucsd.edu

In article <1994Mar1.162350.22173@ke4zv.atl.ga.us> gary@ke4zv.atl.ga.us (Gary
Coffman) writes:

... snip ...

>antennas. For example, a 1/4-wave monopole has a feed point impedance
>at resonance of about 36 ohms. At either side of resonance, the
>impedance (complex) increases. So there are two points where the
>impedance will be closer to 50 ohms than the resonant point. So
>if you see 1:1 SWR on your 1/4-wave monopole, there's something
>wrong. (In fact as a general rule of thumb, if you have a SWR of
>1:1 on any simple antenna which has no special matching network
>at it's feed point, there's something wrong.)

Gary, are you *sure* of this? An extrapolation of what you
wrote says that if you terminate a 50 ohm line with a pure 50 ohm
reactance, the SWR is 1:1. I don't think that's right. When I work
the problem out on a Smith chart, terminating a line with a reactance
equal to it's characteristic impedance yields an infinite SWR. Taking
this to a more reasonable point, the lowest SWR should occur at
resonance, when the antenna impedance is purely resistive; any
deviation from that point will yield a rise in SWR regardless of the
impedance value due to the reactive components. Have I missed
something?

Kim Elmore, [N5OP, PP ASEL/Glider 2232456]
* _·_· __·_ _·· _··_ _·· · _· ····· ___ ·__· _· ····· ___ ·__· _·· _··_ _·_ *
*   Said by NQ0I while working on his shack: *
* "All these *wires*! Why do they call it `wireless'!?"   *
* _·_· __·_ _·· _··_ _·· · _· ····· ___ ·__· _· ····· ___ ·__· _·· _··_ _·_ *

Date: Wed, 2 Mar 1994 09:41:14 GMT
From: ihnp4.ucsd.edu!agate!howland.reston.ans.net!gatech!news-feed-2.peachnet.edu!
news-feed-1.peachnet.edu!emory!wa4mei.ping.com!ke4zv!gary@network.ucsd.edu
To: ham-ant@ucsd.edu

References <1994Mar1.162350.22173@ke4zv.atl.ga.us>, <2l0bor$g9m@ncar.ucar.edu>,
<2l0j7q$g5c@news.acns.nwu.edu>mei.pin
Reply-To : gary@ke4zv.atl.ga.us (Gary Coffman)
Subject : Re: MFJ SWR Analyzers

In article <2l0j7q$g5c@news.acns.nwu.edu> rdewan@casbah.acns.nwu.edu (Rajiv Dewan)
writes:
>In article <2l0bor$g9m@ncar.ucar.edu>, Kim Elmore <elmore@rap.ucar.edu> wrote:
>
>>Taking resonance, when the antenna impedance is purely resistive; any
>>deviation from that point will yield a rise in SWR regardless of the
>>impedance value due to the reactive components. Have I missed
>>something?
>>
>
>I am afraid so. If what you say were true then it would not be possible
>to match, let us say 10 ohm resistive, with a 50 ohm system using
>only reactive components. But this is not correct.
>
>Reductio ad absurdum implies...

No. You're neglecting the phase shift across the matching network.
That's the same as rotation around the constant SWR circle and allows
the transform from one purely resistive impedance to another. When
the reactance is beyond the termination point, that phase shift doesn't
apply. Looking at it another way, the matching network is in some sense
a transformer, while a reactive antenna is not. That was my original
mistake, I neglected to allow for the vectorization of the impedance.

Gary
--
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Date: Wed, 2 Mar 1994 09:28:51 GMT
From: ihnp4.ucsd.edu!swrinde!gatech!wa4mei.ping.com!ke4zv!gary@network.ucsd.edu
To: ham-ant@ucsd.edu

References <henrysCLzps3.4Ez@netcom.com>, <1994Mar1.162350.22173@ke4zv.atl.ga.us>,
<2l0bor$g9m@ncar.ucar.edu>
Reply-To : gary@ke4zv.atl.ga.us (Gary Coffman)
Subject : Re: MFJ SWR Analyzers

In article <2l0bor$g9m@ncar.ucar.edu> elmore@rap.ucar.edu (Kim Elmore) writes:
>In article <1994Mar1.162350.22173@ke4zv.atl.ga.us> gary@ke4zv.atl.ga.us (Gary
Coffman) writes:
> ... snip ...
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>>if you see 1:1 SWR on your 1/4-wave monopole, there's something
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>>at it's feed point, there's something wrong.)
>
> Gary, are you *sure* of this? An extrapolation of what you
>wrote says that if you terminate a 50 ohm line with a pure 50 ohm
>reactance, the SWR is 1:1. I don't think that's right. When I work
>the problem out on a Smith chart, terminating a line with a reactance
>equal to it's characteristic impedance yields an infinite SWR. Taking
>this to a more reasonable point, the lowest SWR should occur at
>resonance, when the antenna impedance is purely resistive; any
>deviation from that point will yield a rise in SWR regardless of the
>impedance value due to the reactive components. Have I missed
>something?

No, you haven't missed anything, but I did. Comes from posting before
the caffeine kicks in. :-(You're correct that the reflection coefficient
will be minimum, but not necessarily zero, when the antenna is at resonance.
What I said about the impedance being 50 ohms either side of resonance
is correct too, but complex impedances are *vector* quantities while the
SWR equation resolves them to scalars. Arrgh!

Gary
--
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Lawrenceville, GA 30244 | |

End of Ham-Ant Digest V94 #53
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